

## Thermopile Detector Radiation Hardened Readout, Phase I

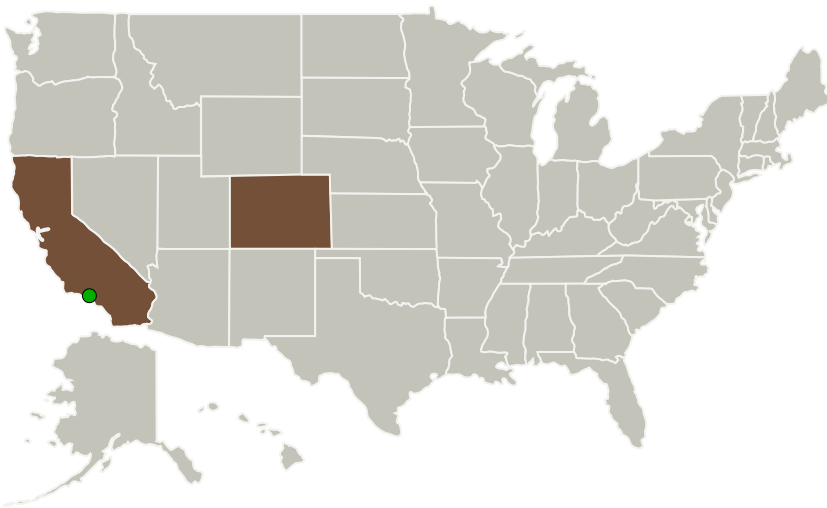
Completed Technology Project (2010 - 2010)



## Project Introduction

The Europa Jupiter System Mission (EJSM) will provide a better understanding as to how gas giant planets and their satellites form and evolve. The Jupiter Europa Orbiter (JEO) is the NASA element of the EJSM. JEO will be built to withstand the intense radiation in Europa orbit and the JEO payload includes a thermal instrument. The thermal instrument is based on thermopile detectors that are intrinsically radiation hard to at least 10 Mrad; however, the thermopile readout ASIC needs to be hardened to tolerate the radiation sources of the JEO mission. Black Forest Engineering proposes on Phase I to modify existing thermopile readout circuitry using radiation hardened by design techniques (RHBD) to tolerate the JEO mission radiation sources. The readout application specific integrated circuit (ASIC) when developed on Phase II and combined with JPL thermopiles will meet the thermal instrument requirements of the JEO.

## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Black Forest Engineering, LLC	Lead Organization	Industry	Colorado Springs, Colorado
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California



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## Primary U.S. Work Locations

California

Colorado

## Project Transitions



**January 2010:** Project Start



**July 2010:** Closed out

**Closeout Summary:** Thermopile Detector Radiation Hardened Readout, Phase I Project Image

### Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/141324>)

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Organization:

Black Forest Engineering, LLC

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

Carlos Torrez

### Principal Investigator:

Stephen Gaalema

### Co-Investigator:

Steve Gaalema

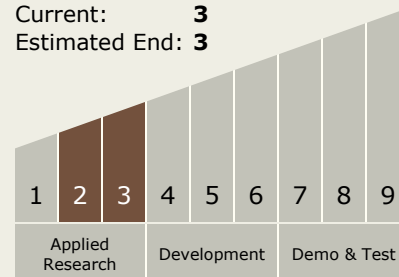
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## Technology Maturity (TRL)

Start: **2**  
Current: **3**  
Estimated End: **3**



## Technology Areas

### Primary:

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.1 Detectors and Focal Planes

## Target Destinations

Earth, The Moon, Others Inside the Solar System, Outside the Solar System, The Sun, Mars